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Multi-messenger astrophysics, cosmology and fundamental physics with next-generation GRB missions

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Modern society is becoming increasingly dependent on technology which can be severely affected by space weather phenomena in the circumterrestrial space. In the recent years, also thanks to Heliophysics and Solar System exploration missions, our knowledge in different fields of space weather science –strongly and intrinsically interconnected–has been dramatically increased. Indeed, an in depth understanding of the physical mechanisms characterising the interactions between the Earth (or other planetary bodies) and their surrounding space environments is the key for determining the short and/or long-term effects of space weather at both scientific and technological levels. In this context, interdisciplinarity assumes a key role in any related theoretical and/or data-based research.

In this talk I will discuss some recent results in the field of Space Weather science with special emphasis on current national and international initiatives in the field. Some examples of planetary space weather science approaches related to solar system investigations, also in view of upcoming missions, will be also presented. In this context, the role of theoretical and/or data-driven modeling and multi-data joint analysis will be further evidenced. Finally, the paramount importance of the exchange of scientific and technological know-how between different communities will be discussed.

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